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ABSTRACT

This study examined children's dialogue about tasks in grades 1 through 6. Sentences produced by 14 children who were rated as having high or low self-direction by their teachers were observed and coded for dialogue features, task features, and emotional tone. Dialogue features included: (1) initiation, which was spontaneous or elicited; (2) mode, which was declarative or interrogative; (3) direction, which was to self or other; (4) task ownership, which was the child's or someone else's; and (5) knowledge content, which was current or elaborative. Task features included which function or object of the task was discussed. Results indicated that children with high self-direction had higher rates of statements, but not of questions, per hour than did children with low self-direction. This was especially true of spontaneous statements. Children with high self-direction used more sentences that involved the task function of planning than did children with low self-direction. Results are interpreted to mean that there is a greater self-level of expertise among children with high self-direction than among those with low self-direction. A list of 29 references is provided. (Author/BC)

Task-Related Discourse as an Indicator of Elementary "Expertise"[1]

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Abstract

Educators have become increasingly interested in helping children gain more effective control over learned skills. Our work focusses on using task-directive speech as an indicator of increasing regulatory effectiveness. We develop a concept of "task" and discuss the role of dialogue about tasks. Task-directive dialogue is observed in "independent work" settings. All sentences produced by or directed to the target child are coded for 5 dialogue features (initiation, mode, direction, task ownership, and knowledge context), 2 task features (task function and task content), and emotional tone. A preliminary study was conducted, describing the task-directive speech of 14 grade 1-6 children rated "high self-directed" (SD) by their teachers and 14 children from the same grades rated "low SD". High SD children had significantly higher rates of statements per hour (but not questions), and especially self-initiated statements (22 vs. 11 per hour). Among spontaneous statements, high SD children had significantly higher rates of sentences involving planning and conditional planning task functions. The data are interpreted as indicating greater levels of elementary "expertise" among the high SD children. We suggest that monitoring children's task-directive dialogue may provide teachers with significant indicators of progress in mastering school skills.

Task-Related Discourse as an Indicator of Elementary "Expertise"

There has been growing interest among educators in a variety of approaches aimed at helping children gain more effective control over their own learned skills. Some researchers conduct this work under the rubric of "strategies" (e.g., Pressley et al, 1990; Siegler, 1986, Zimmerman, 1989) and "metacognition" (e.g., Flavell, 1986; Brown, & Campione, 1986; Swanson, 1990). Some emphasize "expertise" (e.g. Bereiter & Scardamalia, 1986). Many from the Vygotsky tradition emphasize the acquisition of self-regulatory speech and movement through the "zone of proximal development" <u>from</u> adult support, scaffolded tasks, and shared activities <u>to</u> independent mastery of tasks (Diaz, et al, 1990; Moss, in press; Brown & Palincsar, 1989; Rogoff & Wertsch, 1984). The past five years have seen ideas from these traditions merging (e.g., Pressley, 1990; Resnick 1989).

Our own work parallels this trend. We began our collaboration in 1988 with the goal of studying "metacognition" in the classroom. We were aware of an extensive laboratory-based literature which indicated that better functioning children showed more "metacognitive awareness" of strategies ("cognitive operations over and above the processes directly entailed in carrying out a task" (Pressley et al, 1990), had more strategies, etc. There was also evidence that such approaches could be <u>taught</u> to less well functioning children, but that such teaching often failed to transfer to new tasks and situations (e.g.

classroom behavior or learning) (Meichenbaum, 1984). We wondered how more advanced children acquired the "strategic approaches" which they apply in their classroom learning and what might be done to foster this in less advanced children.

We decided to develop a tool for observing "metacognitive" behavior in classroom settings. The procedure we are reporting here is the fruit of that effort. It has gone through many changes as we developed it. Perhaps most significant is movement away from the "metacognition" framework to a focus on task-directive language. In the process, we discovered that limiting our focus to "self-directed" language or private speech was counter-productive. Thus the original metacognitive focus on "awareness of own mental processes" was replaced by interest in the use of language to direct or regulate tasks - own and others'.

The concept of **task** is clearly crucial to observing "task-directive language". We define tasks as carrying out a set of actions with specified materials usually leading to an expected outcome. Generally speaking, when working on a "task", a person's activity and attention are focussed on the selected task. Distractions and alternative activities are "screened out". Once the intended outcome is achieved (or abandoned), the person is more open to alternative activities. Baldwin (1980) and Atkinson (1964) present discussions of this concept in the context of Kurt Lewin's general theory. Ryan (1970) provides a more extended discussion.

A Model of Tasks. A task may be thought of as a "program" or list of instructions for carrying out actions with specified materials, usually leading to an expected outcome. The list of instructions has a **definition,** a title or phrase which serves to identify the list (and retrieve it from storage). Most components of this list of instructions are a sequence of procedures or "subtasks" to be executed in order. The sequence of procedures is the **plan** of the task. Checking or **monitoring** progress on (a) procedural outcomes or (b) external conditions may be a necessary part of the task.[2] Sometimes, the sequence of procedures is conditional upon monitoring the outcomes of previous procedures or the availability of materials or other conditions. This is a **conditional plan.** (Generally speaking, "strategic" issues -- or choices between alternative plans for accomplishing the same end -- involve conditional plans of an "if...then" variety.) The final component of the program of instructions comprising a "task" may be a test or **evaluation** of the result of the task, usually comparing the actual outcome with the expected outcome or "goal"[3]. The results of evaluations are often stored, becoming part of the knowledge the child has about

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[2] Note that when a task is well practiced, some procedures are usually not monitored. However, when problems are encountered (e.g., "unexpected outcomes") "experts" are frequently able to identify the procedure generating the problem, monitor, and "repair" it.

[3] Note, that each **procedure or subtask** specified in the task program list can have the components of a task -- a definition, a plan, and monitoring and evaluating procedures.

the plan that is accessed by the definition. Evaluation usually leads to a decision to (a) repeat or continue the task; (b) modify and continue the task; or (c) change tasks. These five components of tasks -- **defining, planning, monitoring, conditional planning,** and **evaluating** -- are what we call task functions.

The "task functions" described above can apply to any task - human or non-human, verbalized or not. When we consider "metacognition" (Flavell, 1985), "private speech" (Vygotsky, 1987; Diaz, in press), or "task-relevant speech" (Diaz, Neal, and Amaya-Williams, 1990), we are generally considering verbalizations of the task functions just described. What purpose does verbalizing task functions serve? Consider dialogue (with others or with the self) about tasks.

Functions of dialogue about tasks. When talking to another person about a task, a child can **state** a procedure that needs to be done (e.g., "You need a period at the end of the sentence.")[4] The other child can carry this out (assuming she "knows how"). In other words, the effect of the statement in this case is to access the other's procedure for "putting a period at the end of the sentence", and include it in her overall plan, so that she carries it out. The function of overt verbal task statements thus seems to be analogous to reading a program

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[4] Statements can be seen as "directives". Essentially they function like statements in a computer program - asserting the next action to be taken.

statement or reading program output. By making verbal statements about a task, the child accesses plans or subplans (**defining**), moves elements of plans from verbal storage to readiness for action (**planning**); notes progress or problems requiring action (**monitoring**); notes conditions which influence choice of procedures (**conditional planning**); and facilitates storage of information about the results of the task (**evaluating**).

The first child could also **ask** what should be done next (e.g., "How do I do X?"). The second child can provide a statement (or several statements) in reply. In asking what should be done next, the first child was **asking for a statement** (verbal input) about the plan of the task. One can ask others or oneself about the task as a whole (defining), the sequence of subplans or components of a subplan (planning), progress within a plan (monitoring), conditions which influence action choices (conditional planning), or various aspects of the results of the task (evaluating).

Note that if our "target child" is the "second child" - the one **being asked** - the situation is slightly different. (e.g. Teacher: "Johnny, what do you need to do next?" Johnny, "Put away my work.") In this example, the teacher's question led Johnny to access the next step of his task - it was available in storage but he had not to retrieved it. In moving in the direction of "independence" in the zone of proximal development, progress will mean that Johnny can **ask himself** the "what next?" question. Thus it is important to distinguish statements

generated **spontaneously** by a child from those generated as **responses** to other's questions or statements.

When the teacher asked "what next?", Johnny could also have said (and meant) "I don't know." In this example, the next step may also be available in storage but Johnny is apparently unable to retrieve it - or the step simply isn't in storage. He is also unable to spontaneously generate the step through problem-solving. He needs more direct instruction, modelling, help with problem-solving, etc. In this latter case, Johnny is further from "independence" in performing this task than in the preceding example. This kind of analysis permits us to begin to operationalize the notion of the zone of proximal development (Vygotsky, 1978).

Self directed task language. Everything that we have just said about dialogue between two children can also be said of self-directed dialogue - children can make task-directive **statements** to themselves, and **ask** for task information from themselves (ask themselves questions). **In fact, our observations have convinced us that many children overtly do some or all of these things.**

Observing task-related discourse

After considerable experimentation, we found that the most fruitful situations to observe were "independent work settings". There is obviously little "discourse" when teachers are lecturing. Individual children provide little task-related

discourse during "discussions"[5]. However, since "independent work settings" typically occupy more than half of the school day, this was not a problem (Denham & Lieberman, 1980). In the schools where we conducted our study, "task-related" discourse is permitted during "independent work".

Our observers sat close to their target child and recorded everything the child said and everything said to the child (and who said it)[6]. As much as possible, they also recorded behavior and performance - what the child was doing, movement to different locations, etc.

Identifying task-directive discourse. Not all classroom language is "task-directive discourse". We have excluded what we call "social talk" concerning matters not related to the current task of either the target child or whomever is speaking with the target child (e.g., "Did you go to the baseball game last night?"). Similar restrictions apply in most systems for coding "private speech", "task relevant talk", etc. (Diaz, in press). We also excluded what we call "verbal products" - the results of reading, counting, or computing out loud, or verbal answers. (e.g., Child B: "How do you spell sorry?" Child A: "s-o-r-r-y". Child A's response would not be codable as task-directive discourse. Child B's question would be coded.)

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[5] This could be different if the content of discussions was how to carry out tasks.

[6] In this report, we will be concentrating on what the target child said. In future studies, we will also be examining what is said to the child, using the same coding system.

Coding task-directive discourse

Briefly, codable units are identified. Each unit (usually a sentence) is coded for five dialogue features, two task features, and emotional tone. These will be clarified in the following sections.

Identifying the child's task. In identifying what "task" a child is working on, we use observation of the child's activity with materials, the child's own statements, and to some extent the behavior setting the child is in. Changing behavior settings (Barker, 1968) is also an indicator of change in task.

Units of speech to be coded. For practical purposes, we find that the sentence is the appropriate unit to code. Sentences serve to define tasks, state procedures in a plan, state monitored outcomes, or state evaluations. Similarly, sentences are used to query each of these. Complex if..then sentences state conditional plans. Using the narrative records described above, we normally code each task-directive sentence for a number of dialogue context features and task features. (In a few cases, a compound sentence may contain two codable verbalizations. Similarly, brief one or two word comments or especially replies may be codable.) In practice, we have found little difficulty in recording task-directive speech and over 90% agreement in the codable content of paired-observation records. (Disagreement generally involved speech that was inaudible to one of the observers.)

Coding Dialogue Context Features. The specific dialogue

context of each task-directive sentence is important for interpreting what that sentence tells us about the speaker's use of discourse to direct tasks. For example, as noted above, spontaneously generating a planning statement is different from generating a planning statement in response to a prompt from someone else. We have identified five dialogue features: **initiation**, **mode**, **direction**, **task ownership**, and **knowledge context**. These are defined operationally as follows:

1. **Initiation** -- code whether the verbalization was: emitted spontaneously by the target child or elicited by another in response to a question or statement:

   S -- (self) target child emitted verbalization

   C -- other child elicited verbalization (specify who)

   T -- teacher elicited verbalization

   O -- other (specify such as teacher's aide, visitor, observer who elicited verbalization)

2. **Mode** -- code whether the verbalization was:

   S -- a declarative statement: (e.g., "I'm making a picture."; "This isn't working.")[1]

   Q -- a question or inquiry designed to access task information from self or others: (e.g., (to self) "Should I put this first?"; (to other) "How did you get the sparkles to stick?")

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[1] We considered a third mode: imperative. To date, we have found that many or most statements have an imperative or directive intent, and that it is not useful to try to distinguish statements from imperatives.

3. **Direction** -- code to whom the verbalization was directed:

S -- self

P -- peer (specify)

G -- group at large such as peers, or peer and teacher

T -- teacher

O -- other, such as student teacher, observer, visitor (specify)

4. **Task Ownership** -- code whether the verbalization concerned*:

O -- the target child's own task

S -- a shared task: (e.g., with peer)

R -- another child's related task: (e.g., both are working on math -- child B asks target child A for advice)

U -- another child's unrelated task: (e.g., a verbalization about a task that is not related to the target child's task)

5. **Knowledge Context** -- code whether the verbalization is:

C -- concerned with the current immediate task

E -- elaborative, going "beyond the given data",

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* For practical purposes, we have found the own versus other distinction is sufficient. In our observation, there were very few genuine shared tasks. We believe these should be encouraged and studies in future research. See Brown & Palincsar (1989) and Diaz (unpublished) on the role of shared tasks.

extending and clarifying, placing information in context:'

Eco -- (connective), connecting the current task and another task or procedure, serves to access stored information: (e.g., "like a ..." statement)

Eca -- (categorical), categorizing the current task or task function by relating ongoing task to other organizational material: (e.g., "This work is part of our Indian project." "Some people would call this editing.")

Coding Task Features. Task directive statements contain verbs and objects. The verbs will serve one of the **task functions** described previously (defining, planning, monitoring, conditional planning, and evaluating). The objects or **task content** of the verbs will be one of: the **task as a whole** (e.g. "We're painting masks," in reply to "What are we doing?"), a **procedure** (any act or sub-task), an **object** (e.g. "I need a red crayon,"), an **ability** (e.g. "I can do this."), or a **task quality** (e.g., "This is fun!"). Task functions and task content are defined operationally as follows:

1. **task functions** -- code which function the statement or

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' For practical purposes, the distinction between current and elaborative statements is sufficient. Future research, particularly on children above grade 6 and on teacher's statements, may prove the additional sub-categories relevant.

question served:

D -- defining: Verbalization reflects the speaker's attempt to label a task, procedure, or object. May also involve noting features of tasks, procedures, and objects. Note that task labels may be in the form of phrases (e.g., "writing a paper"), task names (e.g., "chess", "spelling charades"), or any other label that serves to identify (access) a task (e.g. "John's game"). Examples: "It's John's game." "That's red paint".

P -- planning: Statement or question concerns the sequence of procedures or what will or might happen next. The verbalization reflects the speaker's intentionality which may be in the form of a statement, request[10], or desire (e.g., "I need ..."), as well as questions. Planning statements or queries conveying sequence are made before the action is carried out. Examples: "Can I do X?" "Mix some soap in the paint." "Where are the sparkles?"

M -- monitoring (on-going task): Statement or question noting progress - or lack thereof - on the task,

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[10] Note, requests for permission to carry out specific procedures or tasks are coded as statements rather than questions. On the other hand, if a child asks what the next step should be (e.g. "Now what should I do?"), the sentence is coded as a question.

commenting on actions or objects, or task quality. Monitoring conveys that the child is comparing his/her own or other's on-going performance against some implicit criterion or goal representation. Examples: "You're going too fast." "I need to slow down." "That's the right one." "I can't do this!" "This is fun!"

C -- conditional planning: Statement or question relating a plan to a condition, or specifying the basis for choosing between alternative plans. These statements or questions combine monitoring and planning. Many have an "if...then..." quality. Other conditional modifiers are also used (e.g. "Suppose that..."). Examples: "If we make noise, then we won't have recess." "If I want yellow, should I mix green and red?"

F -- evaluating (completed or aborted task): Statement or question concerns conclusions on ending the task - regarding the product, the child's ability, or the experience of doing the task. Sometimes, the result of evaluation will be a return to the task. Examples: "This is my best one so far!" "I can't do it!" "The math squares are fun!"

2. **Task Content** -- code the "object" of the task function just coded:

T -- Whole task: task as a whole (e.g., "I'm doing

math.").

P -- **Procedure**: verbalization specifies a component action (e.g., "Next, I'm going to color it."). Note, procedures may include action only (e.g., "You have to push hard."), or it may include an object(s), as well (e.g., "Hammering a nail.").

O -- **Object(s)**: verbalization specifies an object, object characteristic, or symbol (e.g., "Where is the red crayon?"). Note that this category is only used when action is not specified in the statement.

A -- **Ability** (positive or negative): verbalization specifies the speaker's ability to perform the task or subtask (e.g., "I can't do this."). (If a sentence is a "can" statement regarding own task, code Emotional Tone positive. "Can't..." statements regarding own task are given a negative Affective tone codes.)

Q -- **Task Quality**: verbalization specifies some aspect of the experience of doing the task (e.g., "This is boring!", "This is easy!", "This is dumb.") Most task quality statements will also receive a positive or negative Emotional Tone rating. (When analyzing these, it may be important to distinguish own tasks using the ownership dialogue feature.)

Coding Emotional tone. Finally, in order to tap the emotions that accompany performance, each verbal unit was coded

for **emotional tone.** The operational definitions are given below.

P -- **Positive affect**: verbalization and associated expression or gestures indicate positive affect or mood (e.g., "I did a really great job!"). Note, "can" ability statements regarding own tasks are to be coded as having positive affect.

N -- **Negative affect**: verbalization and associated expression or gestures indicate negative affect or mood (e.g., "I don't like doing this.", "This is hard."). Note, "can't" ability statements regarding own tasks are to be coded as having negative affect.

O -- **Neutral affect**: verbalization and associated expression or gestures indicate no discernible affect or mood (e.g., no specific affect evident, expressed in matter of fact fashion.)

The coding categories are summarized in Table 1.

Table 1 about here

A Preliminary Study

Design and Procedures

A research design for studying task-related discourse.

Previous research (e.g., Wang & Peverly, 1986; Zimmerman, 1989; Biemiller, 1983) has indicated that children who function well in school are perceived by teachers to be "self-directed".

Biemiller and Richards (1986) found that autumn teacher ratings of "self-direction" correlate as highly with spring standardized achievement scores as previous achievement scores. Consequently, we decided to compare the task-related discourse of teacher-nominated "self-directed" children with the discourse of "non-self-directed" children. Working with the teachers in the Institute of Child Study laboratory school, we collectively defined "self-directed" children as those who "know what needs to be done and do it." We asked the teachers to rank the children in their classes on this criterion. We then selected subjects for observation on the basis of these rankings.

While this procedure is very crude, we believe that it was sufficient to provide an initial contrast between the task-related discourse of children functioning well in school with those not doing so.

Sample. The sample in this study was selected from a larger pool of observations that we had collected during while developing our observation system. Observations to be coded were selected on the basis of (1) choice of a setting in which self-directed activity was likely to emerge (e.g., "free activity", art room, 'independent work"), (2) equal numbers of teacher nominated children per grade who were identified as high SD (self direction) and low SD, and (3) observation covers at least one complete task. Fourteen observations of high SD children and fourteen observations of low SD children were analyzed using the task-directive taxonomy. The composition of the sample by grade

is shown in Table 2.

Table 2 about here

Coding. Observations were coded by one of the writers (AB) and a research assistant who is an experienced teacher. Coding reliability was over 90 percent on all categories except task functions which was 79 percent. (Most disagreements on task functions involved confusions between the planning and monitoring categories.)

Some Preliminary Results

Two hundred and fifty-three task-directive sentences were obtained over 459 minutes of observation from the high SD group. The high SD group's average rate of sentences per hour was 37[11]. One hundred and twenty-six task-directive sentences were obtained over 306 minutes from the low SD group or an average rate of 28 sentences per hour. Differences in observation time reflect the fact that low SD children tended to spend less time on a single task. The overall rate of sentences per hour did not differ significantly by self-direction group or grade, nor was there a

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[11] This figure is based on determining each child's rate of sentences per hour [= 60(number of sentences/number of minutes)] and averaging these. Thus data from each child is equally weighted. The same approach is used for rates of sentences per hour within each category as reported further on in this section.

significant interaction between SD group and grade (See Table 2)[12].

Dialogue Features. The rates and percentages of sentences in the different categories of the five dialogue features are shown in Table 3. There were no significant differences between high SD and low SD children in the rates of self-initiated, peer-initiated, or teacher-initiated sentences. However, the high SD children did produce significantly more statements (31 vs. 17 per hour, $t(26) = 2.48$, $p<.02$)[13]. They also produced fewer questions (6 vs. 9 per hour), but this difference was not significant. High SD children directed more of their task-directive sentences to peers (21 vs. 9, $t(26) = 2.315$, $p<.05$) but fewer sentences to teachers (10 vs. 15, n.s.). Consistent with the high SD's greater tendency to speak to peers was the fact that they generated more sentences about related tasks (7 vs. 3, $t(26) = 2.33$, $p<.05$).

Table 3 about here

Task Features. When the task features of all sentences

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[12] Large standard deviations precluded finding statistical significance in this preliminary study. If effects of similar magnitude are found with larger samples, they will be statistically significant.

[13] For statistical analysis, different sub-categories are considered to be statistically independent. Thus the fact that high SD's asked fewer questions than low SD's does not necessarily imply that they will make more statements. They could just as easily have made fewer statements.

(both statements and questions) are examined, no significant differences between high and low SD children emerge. However, when only self-initiated statements are considered, some important differences can be seen (Table 4). Overall, the high SD children initiated more statements than the low SD children (22 vs. 11 sentences per hour, $t=2.70$, $p=.01$). When the **task function** categories are examined, the high SD children initiated significantly more planning (8 vs. 3, $t=2.31$, $p<.05$) and conditional planning (2 vs. 0, $t=2.40$, $p<.05$) statements. Differences in the other categories are not statistically significant although the difference in rates of monitoring statements is large (9 vs. 6). There were no significant grade effects or interactions.

Table 4 about here

There were no significant differences between high SD and low SD children in numbers of self-initiated statements per hour in the **task content** categories (Table 4). Further examination of the relationship between types of task contents and types of task functions suggested that there were no important differences between the high and low groups.

Emotional Tone. There were also no significant differences in rates of sentences generated with positive and negative affect. (Overall, these were relatively rare, with the high SD children generating 3.3 sentences per hour with codable affect

while the low SD children generated 2.5.) However, when all sentences with positive or negative affect which concern the child's own task are examined, 89 percent of 27 high SD sentences were positive contrasted with 59 percent of 17 low SD sentences. This difference is significant (Fisher exact test, $p<.05$).

Discussion

Summary. This preliminary application of the coding system to children who varied widely in age, specific tasks observed, and observers, shows that important differences in task-directive language of children perceived by teachers as "high" or "low" in "self-direction" can be reliably demonstrated. The task-directive language of high SD (high self-direction) children included more statements as opposed to questions, and was directed more often to peers. High SD children initiated more planning and conditional planning statements. Low SD children produced most of the sentences expressing negative affect. These data indicate the feasibility and usefulness of the coding scheme.

In this discussion we are first going to consider how findings relate to the issue of "expertise", then examine several methodological points, consider situational influences on task-directive dialogue, and finally note some educational implications of this work.

Does task-directive dialogue indicate the presence of "expertise"? Studies of "experts" in many domains has

suggested differences in the knowledge they had and used about their field of expertise, in the organization of that knowledge, in the strategies they employed when solving problems, and in their motivation and personal striving (Bereiter & Scardamalia, 1986; Meichenbaum & Biemiller, in press). Our "self-directed children" evidenced many of these same features. In terms of knowledge and its organization the high SD children verbalized their activities to a considerably greater extent to both themselves and others than less self-directed children, as well as offering advice to others. We believe this implies the presence of verbal (or verbalizable) scripts or plans with accompanying goal representations for the tasks in question -- in other words, verbal knowledge about the tasks. Thus the high SD children could be described as "elementary experts".

The higher frequency of self-initiated planning, conditional planning, and monitoring statements in the task directive discourse of high SD children is consistent with much of the description of the strategy differences observed in experts. (See Pressley et al's (1990) discussion of the nature of strategies.) The presence of some conditional planning statements (or explicit choices between alternative plans) among the high SD children is important for the development of a "strategic" approach to academic tasks. Finally, in terms of motivation and striving, the "self-directed" children tended to spend more time on task (until completed), and to verbalize more positive ability content and more positive affect, with

relatively infrequent instances of negative affective tone.

Importance of dialogue features. These analyses illustrate the importance of dialogue features in understanding task features. It is not surprising that self-initiated statements play an important role in "self-direction". Such statements reflect active knowledge on the part of the child - about his own and related tasks. While our low SD children in fact talked quite a bit about planning activities, much of this talk was in the form of questions directed at others (e.g., "How do you ...?) or statements elicited by others (e.g., Teacher, "What do you need to do next?" Child, (answers)). Given that low SD children often can provide such answers, it appears that what is needed is an environment that leads them to use their knowledge spontaneously.

Knowledge Context and Task content. The coding dimensions knowledge context and task content provided no useful information in this preliminary study. We are not yet ready to abandon these dimensions, because we believe they will prove important when planning new forms of teaching which nurture higher levels of task-directive language, and when analyzing the task-directive speech of older children.

Situational effects. The empirical data reported here reflects a "trait" approach to task-directive language. In fact, as we have continued our work, we are shifting to a more "situational" way of looking at data. We hypothesize that at least some of the differences between "high" and "low" SD

children's rates of task-directive language reflect the relative "match" of task and child skill with that task. When some of our low SD children were observed in non-academic settings (e.g. art room), they generated considerably more task-directive speech. Specific classroom expectations and tasks probably influence rates of task-directive speech. In a small study involving four children in one classroom, we found roughly twice the rates of speech reported here. In a laboratory study, the rate was again doubled (Meichenbaum and Biemiller, in press). The general point is simply that task-directive speech rates are very sensitive to situational variables. We are currently exploring this issue. If this is true, it should be possible to foster task-directive language to a considerable degree. We have discussed these possibilities in a recent paper (Biemiller and Meichenbaum, in press).

Educational Implications. In a broad sense, we join with many others (e.g., Vygotsky, 1978; Cole, 1990; Collins, Brown & Newman, 1989; Brown & Palincsar, 1989; Bereiter & Scardamalia, 1989; Diaz, 1990) in believing that education needs to place relatively more stress on the development of independent mastery (Diaz, unpublished) or expertise (Bereiter & Scardamalia, 1989) rather than simple performance achievement. Specifically, we believe tools similar to the one described in this paper can assist both researchers attempting to develop new ways of fostering the growth of independent mastery and expertise, and teachers directly. In the case of teachers, rendering expertise

visible makes it possible to monitor the effects of classroom instruction in developing expertise. (For this purpose, we tentatively suggest monitoring spontaneous task-directive statements.) We suggest that in time, teachers will be taught to monitor and teach for independent mastery rather than achievement test performance alone.

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Table 1

Summary of Coding Categories for Dialogue Context Features, Task Features and Emotional Tone

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Dialogue Features

1. Initiation

   S (self) target child
   C other child
   T teacher
   O other (specify)

2. Mode

   S statement
   Q question

3. Direction

   S self
   P peer (specify name)
   G group at large
   T teacher
   O other

4. Ownership

   O own task
   S shared task
   R other's related task
   U other's unrelated task

Task Features

1. Task Functions

   D defining
   P planning
   M monitoring
   C conditional planning
   E evaluating

2. Task Content

   T task as a whole
   P procedure
   O object(s)
   A ability
   Q task quality

Affective Tone

P positive (includes "can" statements re own task)
N negative (includes "can't" statements re own task)
O neutral

Table 2

Distribution of Observations by Grade and Self-Direction Status

	Grade				
	1	2	3	4-6a	All
High SD					
N	4	2	5	3	14
sent/hour	37	47	34	34	37
SD	9	22	22	20	17
Low SD					
N	4a	2	5	3	14
sent/hour	38	27	17	33	28
SD	19	13	13	3	15

a. Combines one child in each of grades 4, 5, and 6.

Table 3

Dialogue Features - Mean Sentences Per Hour by Dialogue Features for High versus Low Self-Direction Children

	Dialogue Features									
Self Direc.	Initiation		Mode		Direc.		Task Ownership		Knowl. Context	
High (HSD)										
N = 14 chil.	self	27	stm.	31	self	6	own	29	cur.	36
	peer	5	que.	6	peer	21	rel.	7	ela.	1
	tea.	5			tea.	10	unr.	1		
	tot.	37	tot.	37	tot.	37	tot.	37	tot.	37
Low (LSD)										
N = 14 chil.	self	19	stm.	19	self	4	own	24[a]	cur.	27
	peer	2	que.	9	peer	9	rel.	3	ela.	1
	tea.	8			tea.	15	unr.	1		
	tot.	28	tot.	28	tot.	28	tot.	28	tot.	28

a. Includes both own tasks and shared tasks.
(**Code**: stm. = statement, que. = question, tea. = teacher, rel. = related, unr. = unrelated, cur. = current, ela. = elaborated, tot. = total)

Table 4

Task Features - Mean sentences per hour for High and Low Self Directed Children - **self-initiated statements only**

	Task Features			
Self Direc.	Task Func.		Task Content	
High SD N = 14	def.	2	task	5
	plan.	8	proc.	9
	c.pl.	2	obj.	7
	mon.	9	abil.	1
	eval.	1	qual.	0
	tot.	22	tot.	22
Low SD N = 14	def.	1	task	1
	plan.	3	proc.	5
	c.pl.	0	obj.	3
	mon.	6	abil.	1
	eval.	1	qual.	1
	tot.	11	tot.	11

(**Code:** Task Func. = Task Functions, def. = defining, plan. = planning, c. pl. = conditional planning, mon. = monitoring, eval. = evaluation, proc. = procedure, obj. = object, abil. = ability, qual. = task quality.